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INTEGRATING SPACE-BASED FIRES INTO THE JOINT FORCE AFTER NEXT

by

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Preface

What happens when out-of-theater combat forces are brought to bear in military operations? Who commands them? Who employs them? How can in-theater and out-of-theater forces fight in a coherent fashion? How does out-of-theater combat power integrate into the joint force after next (JFAN)? This paper answers those questions pertaining to space-based fires. When the weaponization of space commences, our military leadership must be prepared to bring this combat capability online quickly and in an integrated fashion. Those who acquire these systems must ensure the necessary command and control (C2) equipment and methodologies are in place. I hope this paper provides a framework, steeped in joint doctrine, for military leaders to use so our space forces will not have to endure an 80-year debate on organization and employment as the Air Force endured.

My thanks go out to the faculty and students of the Air University who assisted me in this effort. Particular thanks go to my faculty research advisor, Major James Cashin, without whom this effort would be worthy of nothing but the circular file. I would also like to acknowledge the men and women of the 14th Air Force and the Air Force Doctrine Center who assisted my understanding of the organization and employment of air force space forces. In particular Maj Jonathan Hines, Maj Sean Rife, Maj Mark Vidmar, Maj Tom McGraw, Major General Jerry Perryman and Col Michael Wolfert deserve special recognition for acting as a sounding board.

Most of all I would like to thank my wife, Diane, and my daughter Molly without whom none of this would be possible. It is to them I dedicate this paper and my life's work.

Abstract

How should future commanders integrate space-based fires into their combat operations? Space-based fires represent a significant departure from traditional force structure. They present such an interesting challenge because of their global nature and their out-of-theater planning and execution processes. As a result, fires from space will require significant integration from the operational to tactical level. Unfortunately, current doctrine on commanding, planning and executing is insufficient to accommodate space-based fires. This paper blends current joint and service doctrine on space operations, fires, fire support and command and control with emerging methodologies on out-of-theater support operations, to create a more comprehensive view on how space-based fires integrate with in-theater combat forces at the operational and tactical levels. The author contends a strong tactical space control system, leveraging communication combined with the establishment of specific support relationships at the right echelons will allow for coherent and effective integration of space-based fires in the joint force after next.

Part 1

Introduction

If a man does not give thought to problems which are still distant, he will be worried by them when they come nearer.

— Confucious
The Sayings of Confucius

This paper seeks the answer to the following question: how should future military commanders integrate space-based fires into their operations? In seeking the answer, this paper will provide specific answers to fundamental command and control questions so operations will not be stove-piped, but fully integrated as other tools in the Joint Force Commander's toolbox are.

Background and significance

Future military operations may use combat power from space. These space-based fires represent a significant departure from traditional fires. Because of this disparity, current doctrine on commanding, planning and executing fires is insufficient to accommodate space-based fires. These space-based fires present an interesting challenge to commanders at all levels because of their global nature. Much like strategic airlift supporting multiple theaters is operationally controlled by USTRANSCOM during a major theater war; combatant command and operational control will most likely remain with USSPACECOM and its components. As a result, fires from space will require significant integration at the operational to the tactical levels.

Areas such as command and control, fire support, fire control measures, communications and planning and execution processes require analysis and new methodologies if space-based fire support is to be effective in future conflicts.

Limitations of this effort

This research is limited in its ability to accurately foresee the future. It is based on current joint and service doctrine that may evolve significantly. It is also predicated on the notion that airpower will remain expeditionary in nature and the range and speed of air forces will not have evolved to the point where forward basing has become obsolete.

Preview of the argument

How one integrates space-based fires into the joint force after next is determined by how one would command and control these fires. This paper contends that space-based fires will not significantly differ in their effects from aircraft fires. The methods of executing operations from space will differ significantly. Therefore methods of integrating these fires into an air campaign will not differ significantly between space-based fires and aircraft fires, but the tactical methods to carry out these attacks will be radically different. Today out-of-theater combat power is routinely available to the Joint Force Air Component Commander (JFACC). For example, B-2 bombers are capable of attacking enemy forces worldwide but remain CONUS-based. Because the B-2 is an aircraft and not a spacecraft, it is controlled by the Theater Air Control System (TACS). Because spacecraft are not integrated into the TACS system they will need to be controlled by a tactical space control system (TSCS) similar to TACS. This use of a separate command and control system is what makes the "how" of the attack different. The Joint Force Commander will need to establish support relationships with the operational control (OPCON)

authority of space forces since their fires will be integrated into the ATO in the same manner as in-theater forces. The OPCON authority for space forces will integrate with the planning and execution process but utilize their own tactical control system to engage the enemy.

Part 2

Overview of Space-based Fires

Today the ultimate high ground is space.

— General Joseph W. Ashy

In order to properly integrate space-based fires into a joint force one must clearly understand the nature of the medium in which they operate as well as the nature of space-based fires.

Nature of the space medium

Space represents a fourth medium of operations. This medium is different from land, sea and air. The differences between the mediums affect the command and control of space-based forces. Specific differences affecting the command and control are orbits vs. atmospherics, global vs. theater perspective, unique lines of communication and range to target.

"Orbits vs. atmospherics" refers to the transient nature of spacecraft. Spacecraft cannot takeoff and land. They deploy to orbit and stay there. Once on orbit spacecraft either loiter in a geosynchronous orbit viewing multiple areas of operations simultaneously or if in a non-geosynchronous orbit they traverse these areas constantly. Because of this, these spacecraft are not permanently assigned to any theater commander. Therefore, their integration at the tactical and operational level requires solutions similar to other CONUS-based forces. A global perspective results from the orbital characteristics of space-based forces mentioned above. Spacecraft can be brought to bear against a number of global targets in different AORs quickly.

The drawback to this capability is the need to share these limited combat forces between competing geographical unified commands. This represents a nontraditional deployment of combat power requiring a nonstandard solution. Lines of communication (LOC) are the pathways commanders use to communicate to their forces and command them. Space forces operate with a radically different command and control architecture. Their unique LOCs result from the need to employ large satellite dishes to communicate with on-orbit forces. As a result, a simple command may need to travel from theater to CONUS and be relayed to the satellite via a CONUS-based communications system with a large footprint. This may prevent typical tactical control systems from effectively tying into the space combat forces. If true, integrating space forces with the JFAN may be problematic. Range to target reflects the tremendous distances involved between certain orbits and potential targets. This distance translates to increased time of flight of orbit-to-earth weapons. The closer one attacks to friendly forces, the riskier a long time of flight becomes. Integrating forces will need to consider the timeliness of certain space-based fires in their plans.

Space-based bombardment

Space-based or orbital bombardment may take any of a number of forms. These fires could be generated from a satellite or a spaceplane in low earth orbit. This paper contends the integration of these fires is platform independent and more of a C2 issue. This means that regardless of the platform carrying out the attack, the effect will generally reflect one of two broad categories; deep battle and close battle. For the purpose of this paper, consider all preplanned attacks against targets beyond the fire support coordination line (FSCL) to be deep battle. All other attacks (those within the FSCL or those beyond the FSCL requiring close coordination) should be considered to be close battle or tactical-support fires.

Strategic attack and interdiction are deep battle operations. As such integrating these fires represents fewer tactical problems (such as avoiding fratricide) and more targeting problems (like the destructive capability of the munition against the target).

Space-based tactical fire support using orbital bombardment requires different methods of integration. Instead of attacking deep targets independently, tactical-support fires are similar to close air support and short-range artillery fires. As such they require a much greater level of integration and coordination. Close space support should prove to be the most difficult type of fire to integrate into the JFAN.

Space-based directed-energy fires

The most common form of space-based fires found in literature is the space-based laser and space-based high power microwave. These weapons are envisioned in primarily a missile defense role but may have a counterair air role as well. They differ from bombardment fires in their envisioned target sets. This paper contends orbital bombardment reflects certain functions of airpower. Specifically, it primarily reflects strategic attack, interdiction and counterland. Directed-energy fires primarily reflect counter-air operations. This paper does not say directed energy fires may not attack different targets or perform other functions beyond counterair, but for the purposes of the paper integrating space-based counterair assets and space-based strategic attack assets are two separate questions requiring resolution. Directed energy weapons differ from bombardment in that there is no time-of-flight involved with the delivery of the fire. Because of this, integration need not examine synchronization in a time-critical environment.

These two types of fires (orbital bombardment and directed energy fires) will form the basis of the integration effort. The author acknowledges other types of fires may exist in different forms and roles. However, these two appear at the time to be the most likely and if properly

integrated would certainly provide a strong roadmap for the integration of other fires into the JFAN.

Part 3

The Joint Force After Next

Future warfare depends on the rapidity of collecting information and making decisions.

— Gen Chuck Horner, USAF 1998

This paper does not answer the question of integrating space-based fires into today's military but rather into the JFAN. For the purposes of this paper the JFAN is that force described in *Joint Vision 2010.*

Technology in the Joint Force after Next

Joint Vision 2010 (JV 2010) lists as one of its enablers, technological innovations.[1] The technologies employed by future airmen suitably related to this paper would provide them "the capability to collect, process and disseminate an uninterrupted flow of information."[2] Additionally, they "will consist of a system of systems that enables our forces to locate the objective target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required."[3] For example, the JFAN may have broadband wireless communications, with advanced computers capable of realtime automatic target identification and next generation reconnaissance and surveillance. Given this technology, a reconnaissance asset may snap a picture, downlink it to a computer in realtime. Seconds later, the receiving computer identifies a high value target on the

picture and hands it off to an operator. This operator, perhaps operating in an aerospace operations center, and depending on the command and control system supporting him, could decide on the spot if the target should be attacked. If so the computer could automatically hand the support fire mission to the platform best capable of destroying the target. Any discussion of system integration should presume the next generation of command and control systems are capable of fulfilling the JV 2010 goals.

Impact of communications

The future soldier will have communications capability far in advance of what is available today. One must anticipate the likelihood of enhanced point-to-point communication. As a result any attempt to describe a methodology for force integration must include the possibility of a matrixed fire support methodology. Unlike the linear methodology of today where requests for fire move up and down the chain of command, a matrixed fire control plan would preload priorities and release conditions. Then, when a request is made from any echelon it will be possible to bring the joint fires to bear quickly. The high tempo of the future battlefield may make procedural control (delegated decision making based on predetermined rules) more desirable than positive control (centralized decision making).

Sensor and shooter, what if they are the same?

One of the advantages of space platforms is their ability to act as a surveillance or reconnaissance platform. It is the nature of spacecraft that size and weight do not affect the performance of the weapons platform as it does for aircraft. In such an environment space platforms may be multi-role in nature. Therefore, it is possible the abilities to locate and then engage targets will be contained in the same platform. These types of systems will require less

integration in some aspects than air forces. The multi-role nature of space systems must be addressed in any force integration discussion.

Command structures

If the military enhances their ability to collect, process and disseminate information there may need to be fewer command echelons required to command and control their forces. Those responsible for integrating space-based fires must consider the possibility of flatter command structures (those with the fewest distinct command echelons). Command structures affect lines of communication and methodologies on force employment.

Notes

[1] *Joint Vision 2010*,pg 10
[2] *ibid*, pg 16
[3] *ibid*, pg 21

Part 4

Operational Level Employment and Organization of Space Forces

Integrating space-based fires into the JFAN requires integration at the strategic, operational and tactical levels of war. This paper will only deal with the operational and tactical level, because it answers the question of how to integrate disparate forces (air, land, space, and sea) together at the campaign level and below. The following section details how operational forces should be integrated. Recognizing the nature of space-based fires and the environment in which future military members will find themselves, this operational level view attempts to reconcile the difficulties of employing out-of-theater combat power with the need for seamless operations. To do so it must answer the following questions:

- Who is the operational control (OPCON) authority of space forces?
- Who coordinates space-based fires in a theater?
- What is the relationship between supported and supporting commander?
- How are space-based fires integrated into the operational level campaign?
- How are space-based fires integrated into the joint targeting process?

Who is the Operational Control authority of space forces?

Combatant command (COCOM) is "the command authority over assigned forces vested only in the commanders of combatant commands."[1] Inherent in COCOM is OPCON. OPCON, if delegated, is "the authoritative direction for all military operations."[2] OPCON should be "exercised through the commanders of subordinate organizations."[3] United States Space Command (USSPACECOM) conducts space operations[4] and is "the single point of contact for

military space operations."[5] AFSPACE is the Air Force Component Command for USSPACECOM. USSPACECOM is currently only organized into service components. This paper assumes the majority of space-based forces will, as they are today, be organized, trained and equipped by the United States Air Force. Therefore, it is reasonable to conclude OPCON of space-based fires will be under the operational control of the Air Force Component Command , AFSPACE.

OPCON may be delegated to another commander. Therefore this paper must answer the question should OPCON to be transferred from AFSPACE to a theater commander? Because of the methods of commanding space forces and the global nature of space-based fires and their deployment on orbit, there are no real instances when it would be proper to transfer operational control of space–based fire capable forces to the in-theater Commander, Air Force Forces (COMAFFOR).

The first reason not to delegate OPCON is in order for the space-based fire forces to be transferred, the gaining commander should be able to plan for the use of these forces and conduct traditional joint planning for their execution. To accomplish this feat effectively, a Joint Force Air Component Commander (JFACC)/COMAFFOR should have the proper equipment and skilled personnel in theater with the ability to plan and assess all phases of the mission. Planning space missions is much more complicated than simply assigning targets to platforms and synchronizing and integrating the effects caused by the attacks. Planning would include things such as orbital station-keeping and maneuvering, resupply via spacecraft, engagement window determination, the effects of space environment and on-orbit fratricide prevention. Equipment needed to plan for space operations include super computers and numerous large satellite dishes. Since in-theater planners will most likely not have the technical skills or equipment to do these

things, then AFSPACE should retain force execution authorities while creating a support relationship with the theater. This answers the question of why a theater commander wouldn't want OPCON. Next this paper will examine why the current OPCON authority wouldn't want to delegate it. First, the nonstandard lines of communications wherein all space planning and execution is done rearward in fixed facilities is nonconducive to expeditionary operations. Second, there is a growing desire for creating a smaller footprint of personnel forward. Any compelling reason to bring space planning and execution forward into a theater of operations is counterbalanced with the enormity of the C2 personnel and equipment required to operate a space force. Therefore, it will most likely remain in the rear. This does not mean the JFACC will not control the effect, a liaison element (see part 5) will be present in the JAOC to coordinate the space-based fires. The relationship between AFSPACE's liaison and headquarters AFSPACE will most closely resemble the director of mobility forces' (DIRMOBFOR) relationship with the Tanker Airlift Control Center (TACC) at Headquarters Air Mobility Command (AMC).[6]

The second reason not to transfer OPCON is the global nature of space forces due to the orbitology of the forces. These combat forces must be prepared to support multiple contingencies worldwide. Because space-based forces are global, their effects are apportioned and not the forces. Therefore, transferring operational control to one theater commander and not the other is undesirable. Bombers represent an out-of-theater combat capability where OPCON is transferred. When bombers depart from CONUS, OPCON is transferred to the JFACC who uses his TACS system to command and control them. When the bombers depart the AOR, OPCON returns to the original commander who brings the bombers back to CONUS. This cannot be the case for space forces however. Space forces do not enter and depart specific

AORs. Likewise, a single spacecraft at geosynchronous orbit and therefore over the theater of operations at all times, is still at a sufficient altitude where it can support more than one geographical CINC simultaneously.

Who coordinates space-based fires in a theater?

Space-based fires should be commanded by the JFACC within a theater. Space-based fires represent a functional capability instead of a geographic capability. As such, space-based fires can create effects theater-wide. Though the mission execution methodology may differ, the JFACC is the supported commander for theater-wide attacks including strategic attack and interdiction.[7] Additionally the JFACC has theater-wide responsibility for counterair operations[8] and is a supporting commander for close air support (CAS) and air interdiction operations within the land component commander's area of operations (AO).[9] This paper contends space-based fires will create effects similar in nature to those effects currently created by aircraft. Therefore, to support the premises of unity of command and centralized command-decentralized execution theater wide effects resembling those created by airpower should be controlled by the JFACC. Furthermore, the USAF intends every COMAFFOR will operate an Aerospace Operations Center (AOC, a Joint AOC if the COMAFFOR is designated the JFACC)[10]. It will do so with trained people who thoroughly understand how space assets can be integrated into the air campaign and who are equipped to interface with the AFSPACE.[11] Just as there is no need to similarly man and equip the supported CINC's staff or another functional or service component operations center to command the theater's air forces, it would be inefficient to man and equip the JFC's headquarters to plan and coordinate missions easily planned and coordinated by the JFACC.

What is the relationship between OPCON authority and the supported commander?

The appropriate relationship between the OPCON authority and the JFACC is a support relationship. Why create a support relationship? A support relationship is established when "one organization should aid, protect, complement or sustain another force."[12] Space-based fires certainly complement airpower. Should the JFACC own the forces he uses in battle? This paper contends that is unnecessary. One of the principal guiding concepts of the support relationship is "you need not own the force to control its effect."[13] When a support relationship is established the supported commander who does not own the force still provides the general direction of the supporting effort. This is described in Joint Publication 0-2, which states,

> "the supported commander will have the authority to exercise general direction of the supporting effort. General direction includes the designation and prioritization of targets or objectives, timing and duration of the supporting action, and other instructions necessary for coordination and efficiency."[14]

The use of the support relationship is consistent with current Air Force operations. For example, close air support is provided by the JFACC. Under the theory of "I must own the resource to control its effect," the ground commander should get tactical control (TACON) of the aircraft. This is not done. Instead the ground commander through the air liaison officer provides the general direction of the supporting effort to the aircraft which then accomplishes the mission determined by the ground commander without a transfer of TACON. This is how space support should be viewed as well. One need not own or have OPCON/TACON of the space system in order to have it accomplish a desired mission. What is essential is the establishment of an appropriate support relationship.

Is it preferable to have this support relationship with USSPACECOM rather than AFSPACE? The answer is no. Due to the heightened ops tempo resulting from the impact of

improved technology, expanded communications and flattened command structures the best method of tying the force provider to the theater is to go directly from operational provider to operational employer. Therefore, it is operationally unwise for AFSPACE to receive mission type orders from USSPACECOM when it can receive those orders directly from the supported commander. Historically, USCINCSPACE has tactically controlled its forces. This is evidenced by the space surveillance center and the missile-warning center receiving specific tactical direction from the Unified Commander's Staff. Recently, an effort has been underway to delegate tactical decision making downward. This paper contends this migration of decisions downward will continue and fire support tasking will be pushed downward as well. This does not mean USCINCSPACE is not involved with space-based fires, rather he is involved in apportionment and weight of effort issues at the strategic and operational level, while AFSPACE coordinates employment at the operational and tactical level.

How are space-based fires integrated into the operational level campaign?

At the operational level space-based fires can be easily integrated. The Joint Air and Space Operations Plan (JASOP) represents the operational level plan for the employment of aerospace forces[15]. It contains five products resulting from a five stage planning process.[16] The first four stages; operational environment research, objective determination, center of gravity identification, and strategy development are done independently of force structure.[17] As such, it can be said, the employment of space-based fires is fully integrated into these four processes. Stage five, JASOP development, considers capabilities and forces and how to integrate and command them. It is in this stage space-based fires are integrated into the JFAN's air campaign. Space-based fires are presented to the JFACC along with other fire systems (Naval Cruise Missiles, Army Advanced Tactical Missile System ATACMS) which are then built into the

JASOP which "integrates the efforts of joint air and space capabilities and forces"[18] "into a cohesive whole."[19] Because the JASOP considers space forces and is a tool to integrate different service combat capabilities into an integrated effort, the author contends integrating space-based fires into the JFAN using the operational level air campaign plan requires little effort.

How are space-based fires integrated into the joint targeting process?

The joint targeting cycle will still be the standard for space-based fires. Should space-based fires require the same amount of time to plan for as an aircraft sortie, then complementary planning cycles will be required. Synchronization of battlerhythms will allow AFSPACE and the JFACC to conduct parallel planning required of space-based fires. The JFACC will handoff targets. If AFSPACE can service those targets with space-based fires, those targets will be loaded into the air tasking order as a request for fire support and then AFSPACE will mission plan the individual sorties. It is possible the use of advanced computer technologies will improve the efficiency of the combat planners in the Joint Air Operations Center (JAOC). Improved intelligence tools allowing for faster target identification and greater automation of employment plans such as the air tasking order (ATO) may shorten the planning and execution process remarkably. If this is the case, it will take almost no time to plan and execute a space-based fire mission. Unlike an aircraft mission which must consider pilots, ingress routes, threat areas and how to synchronize attacks with suppressing enemy air defenses, tanker support et. al. orbital bombardment will, this paper contends, resemble conventional artillery more than aircraft strike missions. If true, integration becomes simple. Once targets are approved combat planners match space-based fire missions against targets until the missions allocated to the JFACC are exhausted. These fire missions are then sent to AFSPACE who executes them immediately. This is similar to the JFACC's employment of the Army Tactical Missile System (ATACMS)

missile. The Land Component Commander (LCC) releases a certain number of sorties per day to the JFACC who by passing strike coordinates to the LCC via the Battlefield Coordination Detachment (BCD) can have munitions on target in minutes.

Opposing views

Proper analysis of the subject matter requires a review of the opposing points of view. Indeed, there are other methods to integrate space-based fires into the JFAN. However, this paper contends such methods are inefficient or ineffective. In this section, certain questions answered throughout Part 4 will consider opposing points of view, then the author will provide a counterpoint to the opposing view.

Space-based fires may be truly joint in nature, like JSTARS. If so the force provider may not be the USAF. It is a possibility the Navy or Army may develop their own space-based fire weapon systems. If true, would the integration at the operational level be different? All space-based fires controlled by the JFACC would be integrated identically. Those space forces identified as "organic" and operationally controlled by a geographical component commander could theoretically integrate space-based fires into the echelon above corps artillery system or the naval strike force capability. However USCINCSPACE is the combatant commander for all space-based weapons[20] and would have to transfer operational control to the gaining geographic component commanders. Because this would create a "division of aerospace power" and would violate principles of unity of command, thus creating the potential for failure as was the case during the Battle of Kasserine Pass,[21] it is unlikely to occur. The author believes transferring space-based forces, which can perform operations in multiple theaters simultaneously, is an inefficient use of space-based forces.[22] Likewise transfer of operational control would have to include not only the weapon system but the support and logistical piece as well. These forces

will be CONUS-based. Therefore, it would be both ineffective and inefficient for a theater commander to control logistics and support of his forces from the CONUS when a support relationship gives him the firepower without the logistical and administrative duties.

The most likely alternative to the JFACC commanding space-based fires is the JFC commanding these forces. Operational level forces, which can be commanded at a lower echelon, should be. The JFC is not organized and equipped to act as a component commander for these forces. Lessons learned from DESERT STORM surrounding the dual hating of General Schwarzkopf as the JFC and Joint Force Land Component Commander support this.[23] Likewise splitting the missions of strategic attack and air interdiction between two commanders violates the principles of unity of command. Additionally there has been talk of a space component commander (SCC) co-equal with the JFACC. If out-of-theater forces are not transferred to the theater as the author contends, then the SCC has no forces to command. Likewise, the unity of effort argument applies to this situation as well.

If operational control is not transferred, either a support relationship must be established, or tactical control must be transferred. The author contends space-based fires will require a separate tactical space control system to execute forces. If so, transferring tactical control would not be possible. If a support relationship is established, should it be between JFACC and COMAFSPACE not the JFC and USCINCSPACE who act as intermediaries between the JFACC and AFSPACE? Communication is less effective when a command echelon is inserted between a force employer and a force provider. Since the effectiveness of combat support operations hinges on communications and the ability of the supported commander to communicate the general direction of the support effort to the supporting commander, combat effectiveness may diminish with an extra command echelon in-between. As long as the planning and execution of

space-based fires is done at the JFACC and AFSPACE level as the author contends, the support relationship should be between those commanders.

Notes

[1] Joint Publication 0-2, Unified Action Armed Forces, 24 February 1995, pg xi
[2] *ibid*
[3] *ibid*, pg III-8
[4] Joint Chiefs of Staff, J-5, Unified Command Plan: For Instructional Purposes, 29 September 1999, pg 6
[5] *ibid*
[6] Air Force Doctrine Document 2, Organization and Employment of Aerospace Power, 28 September 1998, pg 72
[7] Joint Publication 3-56.1, Command and Control for Joint Air Operations, 14 February 1994, pg II-3
[8] *ibid*
[9] *ibid*
[10] Air Force Doctrine Document 2, pg 48
[11] *ibid*, pg 67
[12] Joint Publication 0-2, pg III-10
[13] Lea, Perryman, Wolfert Command and Control of AFSPACE Forces, May 1999, pg IV-7
[14] Joint Publication 0-2, pg III-10
[15] Air Force Doctrine Document 2, pg 75
[16] *ibid*, pg 76
[17] *ibid*, pg 76-81
[18] *ibid*, pg 82
[19] *ibid*, pg 75
[20] Chairman of the Joint Chiefs of Staff Report on the Roles Missions and Functions of the United States Air Force, III-6
[21] The Battle of Kasserine Pass was fought in North Africa during World War II. Aircraft were divided up and assigned to ground commanders. The battle was lost by the Americans and since that time Kasserine Pass is synonymous with the potential for airpower failure when unity of command of air forces is not established.
[22] Air Force Doctrine Document 2, February 2000, pg 45
[23] Michael R. gordon and General Bernard E. Trainor, The General's War, pg 413

Part 5

Tactical Employment of Space-based fires

Operationally, space-based fires, particularly those used for strategic attack, can be easily integrated into the JFAN. Tactically it is much more difficult to bring out-of-theater forces to bear when close coordination is required. A number of integration issues must resolved for complete integration. They are: how do space-based fires integrate into the joint fire support system; how are space-based fires integrated into joint fire support planning and coordination; are there any specific coordination and control measures unique to space-based fires; and how are space-based fires controlled outside of the joint fire support system? This paper will quickly review the joint fire support system and then introduce the concept of a tactical space control system to answer these questions.

The Joint Fire Support System

According to joint doctrine "joint fire support is the synergistic product of three subsystems: target acquisition, command and control and attack resources."[1] This paper will address each of these areas then tie them together with a proposed tactical space control system organizational structure.

Target acquisition.

Space-based fires should use the traditional target acquisition systems, such as spotters, and reconnaissance aircraft. In this matter, integration is simple. Particularly, if one presumes the rapid advances in networked and point to point communications integrated with a priority based procedural control for the tasking of target acquisition systems. One of the unique aspects of space weapons mentioned earlier is their potential multi-role capability. In this case, space-based platforms may have the ability to provide their own target acquisition capability. Additionally this target acquisition capability may also be provided to other joint forces in a fire support role. Each of these factors enhances and eases the integration effort.

Command and control

Joint doctrine discusses the role of command and control in fire support. Joint Publication 3-09, Doctrine for Joint Fire Support, 12 May 98 says on page II-4

> C2 systems bring all information together for collation and decision making. C2 systems personnel, equipment and a variety of related procedures support the execution of joint fire support missions. Unity of effort is the key to the effective coordination of joint fire support. Vertical and horizontal coordination is also essential for effective joint fire support. For this reason, service and functional commanders provide a hierarchy of fire support coordinators, fire support coordination agencies and liaison officers.

If true, effective integration of space-based fires into the joint fire support system requires four actions to be taken. First, proper command relationships must be established. This was discussed at length in section three. Second, space-based fires must be fully integrated into the fire support C2 systems. It is imperative that future systems performing the role of Theater Battle Management Core Systems (TBMCS) have space-based fires fully integrated into them. Computer systems must fully exploit the advances in technology and provide a seamless integrated fire support C2 system where all forms of support from naval gunfire to close air

support and space-based fires are executable. It is not desirable to create unique communications or computer decision aids for prosecuting space-based fires. The best path of integration is one in which common C2 systems are fully capable of handling the myriad of joint fires. Third, the Joint Force Commander must fully integrate space-based fires into his policies, priorities, and plans. Fourth, for proper integration, space support fires must have representation within critical fire support C2 nodes. JP 3-09, Doctrine for Fire Support, identifies these critical fire support C2 agencies.[2] Representation within these nodes requires liaisons, which the next section will discuss.

Liaison agencies

The author recommends the following agencies and liaisons be established:

- A senior space liaison element to the JFACC (much like the Battlefield Coordination Detachment)
- A space liaison to the deep operations support cell or corps level space-based fire support coordination liaison
- A tactical space control party assigned at the corps, division, brigade and battalion echelons as necessary.
- A space liaison to the Marine Expeditionary Force Fires Coordination Center
- A space liaison to the Supporting Arms Coordination Center
- A space liaison to the Navy Tactical Air Control Center

These liaisons and fire support agencies allow close support to take place. Just as coordinating artillery fire requires a large presence in the AOC, so too will the agency coordinating space-based fires. This paper will refer to this agency as the Space Fires Coordination Team (SFCT). The SFCT would field requests for fire from the JFACC concerning targets of opportunity and would be the conduit between the strategic attack platforms and the AOC. Additionally it would ensure the AOC and the CONUS-based space planners would have an integrated targeting process and complementary battlerhythms. Additionally, if space-based fires can provide close

support one should plan to place a space equivalent of the air liaison officer (ALO) within those critical nodes having ALO representation. This space liaison officer (SLO) would serve an identical function as the ALO but would reach back into a tactical space control system (TSCS, to be discussed in detail in the next major section) to direct fires instead of the organic in-theater theater air control system. This TSCS provides COMAFSPACE the means to exercise operational and tactical control of his supporting fire systems. It includes all coordinating agencies and C2 nodes required to allow a call for supporting fire to be generated at a forward tactical echelon and have it processed and executed by COMAFSPACE forces. It also includes those CONUS and space systems required to monitor, assess and execute realtime space missions. Additionally, SLOs would be organized into tactical space control parties analogous to the tactical air control party (TACP). These TSCP elements would

- Be tailored to the unit they support
- Provide interface between the unit it supports and the TSCS
- Provides final attack control for CAS missions
- Advise the supported commander on capabilities and limitations of supporting space-based fires[3]

Attack resources.

Space-based fires represent the attack resource. They include the on-orbit platforms capable of creating space-based fires. As mentioned earlier they include orbital bombardment platforms capable of strategic attack, interdiction and close space support, space-based lasers, and space-based high-powered microwaves.

This paper contends a tactical space control system analogous to a tactical air control system is necessary to properly integrate space-based fires into combat operations. The following section discusses the TSCS and its major components.

The Tactical Space Control System

The challenge of integrating fires is mostly wedging a new type of combat capability into existing planning and execution processes. However, complete integration is unachievable if there is no C2 structure on the space side with which to interact. Many aspects of a tactical space control system have been discussed in the previous sections. This will serve as a summary on the basic system required for total force integration to take place.

Terrestrial Fire Support Component Commander.

Every organization or system requires a single commander. If space-based fire forces are presented by more than one service, USCINCSPACE should designate a single commander to command all space-to-Earth fires. This commander should be the one with the ability to command and control these assets and who has the preponderance of these assets. It will most likely be the Air Force Component Commander, COMAFSPACE, as the author contended in Part four.

Space's Aerospace Operations Center.

The above mentioned component commander should have his own AOC. This AOC for AFSPACE is currently the 14th Air Force AOC at Vandenberg AFB. Here operational level decisions on space forces are made. In the future, this AOC will need to take on more of the tactical level decisions made by theater AOCs. Just as the "focal point for tasking and exercising operational control is the AOC, (and is) the senior element of the TACS,"[4] the space AOC will be the center of the senior element and focal point of the TSCS.

The Exoatmospheric Airspace Control Authority (EACA).

The space traffic controller mentioned in SPACECAST 2020 is more properly named the exoatmospheric airspace control authority (EACA). As the JFACC is normally the airspace control authority (ACA), so too should the component commander with the preponderance of forces on orbit be the EACA. This individual will create and adjudicate all exoatmospheric aerospace control measures and will be responsible for all orbital airspace coordination areas above the earth's atmosphere. In order to accomplish the mission the EACA will need a space surveillance system.

The Space Surveillance Network.

Just as AWACS and ground radars provide an airspace picture to the theater air control system, the TSCS requires a space surveillance network to provide him with an orbital picture. This network would identify and track all objects within his area of interest. This network is already in place. Future systems should leverage the advances in communications and tracking and identification technology to be fully compatible with theater C2 systems.

Liaisons and Fire Support Control Elements.

These elements mentioned previously facilitate the close coordination required to bring space-based fires into combat. They are required at all critical C2 fire support nodes. There are three basic types. The first is liaison. Liaisons should be stationed at all critical C2 nodes. The second is the senior space team in theater coordinating space-fires. This team is located in the JAOC and adopts the DIRMOBFOR's model of interagency relationships. The last fire control elements are the tactical space control parties. These are more robust liaisons capable of calling in fire missions. They are analogous to tactical air control parties. They should be assigned at the corps, division, brigade and battalion echelons as necessary.

Fire support planning and coordination

Permissive measures

Because space-based fires are most appropriately and easily integrated into the JFAN by laying the majority of operations on top of the existing doctrine regarding air operations and joint fire support, the typical permissive fire measures should not change. JP 3-09 lists three permissive fire measures: the coordinated fire line, the fire support coordination line and free fire areas.[5] These measures are sufficient for space-based fires and therefore require no additional amplification for integration.

Restrictive measures

Space-based fires should cause a change in the restrictive measures. Specifically, changes are required to the airspace coordination areas (ACA) if proper integration is to occur. "ACAs are used to ensure aircrew safety and effective use of indirect supporting surface fires by deconfliction through time and space." SPACECAST 2020, a Chief of Staff of the Air Force study predicted the need for a space traffic control capability.[6] Space traffic control would "prevent inadvertent illumination (by Lasers) and ensure collision avoidance for high value payloads."[7] If true then a boundary will be established between air and space. Space-based fires will requires coordination through terrestrial ACAs and through a space control area. The airspace control authority will need close coordination with the space control authority. The liaison element co-located with the JFACC should enable this process. Robust communications will be required and computer aids should integrate the complexities of airspace control with space traffic control. Successful deconfliction of operations on the air-space boundary can prevent fratricide and unintentional damage. Space-based weapons can be placed in tight, hold or free status as other fire support weapons are, by EACA. Likewise, a JFACC employing

weapons across the space boundary (ATACMs for example) would require coordination with his the EACA before firing.

Airspace control measures

The ACA and the EACA will establish air control measures within their respective areas. Integration at the component level between the ACA the EACA will need to occur. The senior space liaison element will be necessary to facilitate integration.

Opposing Views

Additional analysis of this section requires the author to answer the question should space-based fires be controlled similar to aircraft or is there a better way? The other method of employing supporting fires is that of field artillery. If space-based fires resemble artillery fires more than strategic attacks, should the aerospace model still be used? The answer is yes; the aerospace model should be used. Artillery represents organic fires centrally controlled to directly support ground operations. Because space-based fires can create theater wide effects, it must be controlled in a manner consistent with the ability to properly prioritize and integrate the space-based fires for the greatest effect. Parceling out space-based fires like artillery diminishes the potency of spacepower as it does with airpower. Because spacepower is to be employed as part of an aerospace force, the tactical integration of these fires should reflect how airpower is integrated and employed at the tactical level. It does.

Notes

[1] Joint Publication 3-09, Doctrine for Joint Fire Support, 12 May 98, pg II-1
[2] *ibid* II-6 – II-9
[3] *ibid*, pg II-12
[4] *ibid* II-11
[5] *ibid* A-1-5
[6] Air University, SPACECAST 2020, 22 June 1994, pg 11

Notes

[7] United States Space Command Long Range Plan, March 1998, pg 36

Part 6

Conclusion

Summary

Space-based fires can be integrated into the JFAN. To do so one must capitalize on the aerospace quality of those fires. Most important is the command and control of these fires. The JFACC should be the in-theater focal point for coordinating and employing space-based fires. The CONUS-based terrestrial fire support component commander should support him. This commander will retain OPCON and TACON of all space-based fires and most likely be COMAFSPACE. In most regards space-based fires resemble other airpower fires. As such at the operational level space-based fires are adjuncts to the air campaign and require no additional operational level planning. Likewise space-based fires follow the joint targeting cycle so fires requiring extensive planning can be integrated into the ATO process while fires requiring little if any planning may be tasked outside of the ATO cycle like Close Air Support or more traditional artillery. Integrating these fires tactically requires integration between the theater air control system and the out-of-theater tactical space control system. This is accomplished with liaisons and fire support control elements. Tactical integration requires detailed endoatmospheric and exoatmospheric airspace control integration as space-based fires cross the exo-endo atmospheric boundary. This tactical space control system must be under a single commander, COMAFSPACE, who can bring combat power to bear quickly for a joint force commander.

Conclusion

In conclusion, the integration of space-based fires into the joint force after next is a crucial activity to ensure the nation's aerospace forces provide an integrated and synergistic combat capability to a joint commander. The author hopes the lessons learned from the past will be applied, particularly those showing the failures of dividing airpower (Kasserine Pass) or the success of uniting it (DESERT STORM). In time, as combat power is generated from space, it must be integrated into existing C2 structures when possible. By using existing planning and execution methodologies, stovepiping can be avoided and a truly lethal combat force can be integrated into the joint force after next.

Glossary

ACA	Airspace Control Authority
AFSPACE	United States Space Command Air Forces
ALO	Air Liaison Officer
AMC	Air Mobility Command
AO	Area of Operations
AOC	Aerospace Operations Center
ATACMS	Advanced Tactical Missile System
ATO	Air Tasking Order
BCD	Battlefield Coordination Detachment
C2	Command and Control
CAS	Close Air Support
COCOM	Combatant Command
CONUS	Continental United States
COMAFFOR	Commander Air Force Forces
DIRMOBFOR	Director of Mobility Forces
EACA	Exoatmospheric Airspace Control Authority
FSCL	Fire Support Coordination Line
JAOC	Joint Aerospace Operations Center
JASOP	Joint Air and Space Operations Plan
JFACC	Joint Force Air Component Commander
JFAN	Joint Force After Next
JFC	Joint Force Commander
JV 2010	Joint Vision 2010
LCC	Land Component Commander
LOC	Lines of Communication
OPCON	Operational Control
SCC	Space Component Commander
SFCT	Space Fires Coordination Team
SLO	Space Liaison Officer
TACC	Tanker Airlift Control Center
TACP	Tactical Air Control Party
TACS	Theater Air Control System
TACON	Tactical Control
TBMCS	Theater Battle-management Core Systems
TSCS	Tactical Space Control System
UNAAF	Unified Action Armed Forces

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